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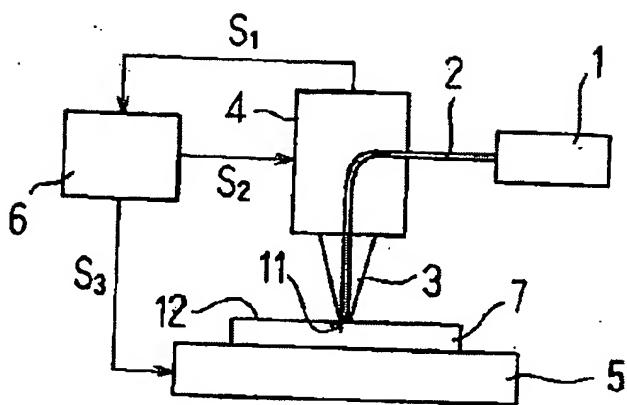
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**TITLE : LASER MACHINING APPARATUS AND
IT'S METHOD, AND OPTICAL
ELEMENT MACHINED BY USING THE
SAME**



ABSTRACT : PROBLEM TO BE SOLVED: To provide a laser machining apparatus which is able to perform micro-fabrication under sub-micron to a physical object, corresponding to the increase of memory capacity of an optical disc, in manufacturing diffraction grating of a hologram element used for a DVD device and the like.

SOLUTION: The short wavelength ultraviolet radiation laser is induced to an optical fiber 2, the tip of which is derived to the top of a probe 3 of AFM(atomic force microscope) 4. An optical transmission part 11 is formed by acuminating the tip of prescribed optical fiber 2 to bore a micro hole having the dimension less than the wavelength of prescribed ultraviolet laser. The contact place light of prescribed ultraviolet laser, generating at the other end of the optical transmission part 11, gives micro-fabrication to the surface 12 of a processing substrate 7 which is located in the area of the contact place light. Furthermore, the probe 3 of AFM 4, measuring processed dimensions on the surface 12, monitors the processing condition by the contact place light.

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